

Groundwater Resources of the Pee Dee Basin

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Land, Water and Conservation Division



Pee Dee River Basin Council – Meeting #5 (Hybrid)
Sumter Water Plant 6
October 25, 2022



South Carolina Physiographic Provinces

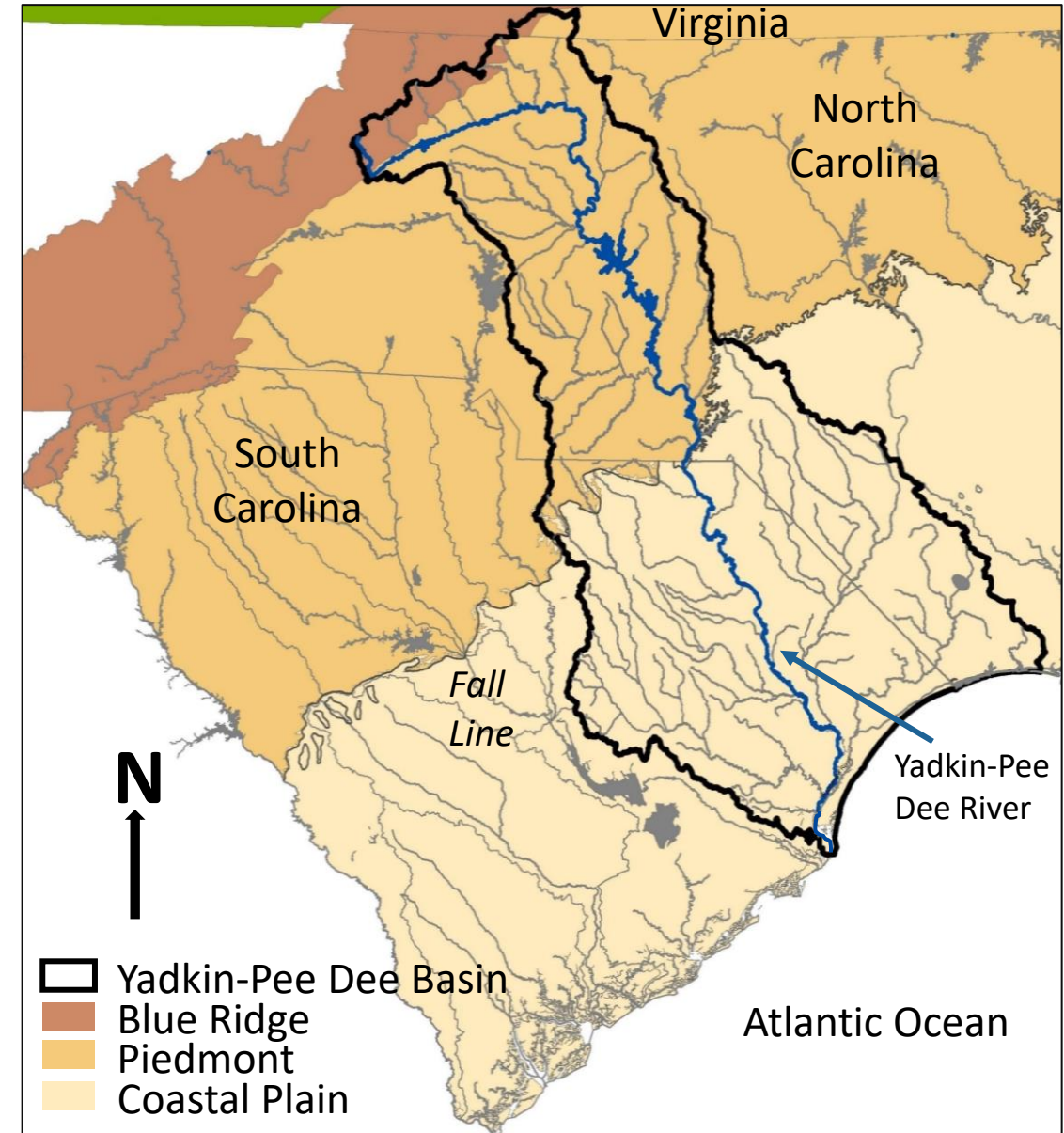


■ Blue Ridge and Piedmont

- Elevation ranges from 3,300 (Blue Ridge) to 1,000 ft at the foothills (Piedmont) to 450 ft near the Fall Line
- Underlain by metamorphic and igneous bedrock
 - Groundwater wells tap crystalline rock fractures and saprolite

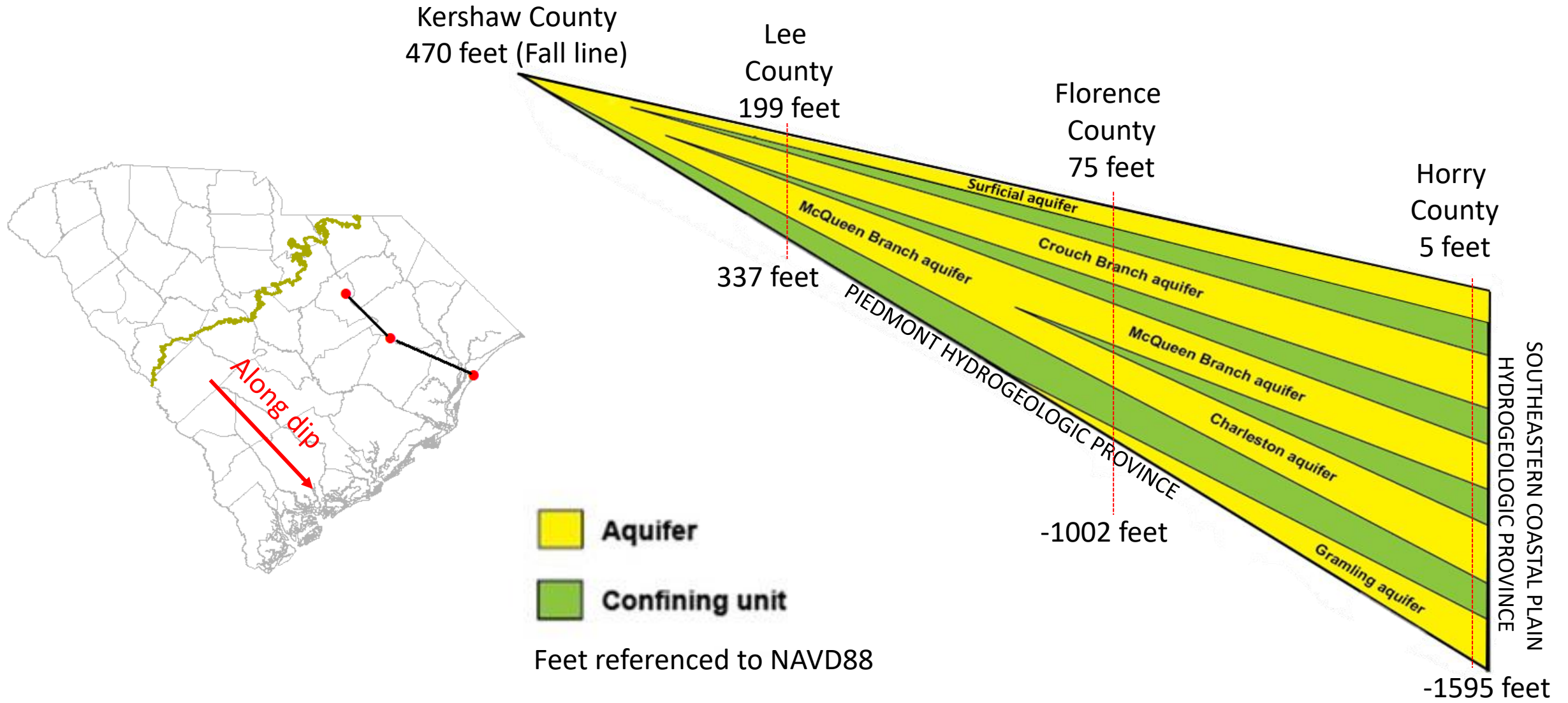
■ Coastal Plain

- Elevation ranges from 450 ft at Fall Line to Sea level at the coast
 - Sediments thicken from zero at the Fall line to greater than 1,500 feet in Horry County
- Encompasses nearly 2/3 of the state and characterized as a wedge of sand, clay, silt, and limestone
- Permeable sand and limestone form the State's most important aquifers
 - Abundant volume of stored water represents a vital resource throughout Coastal Plain



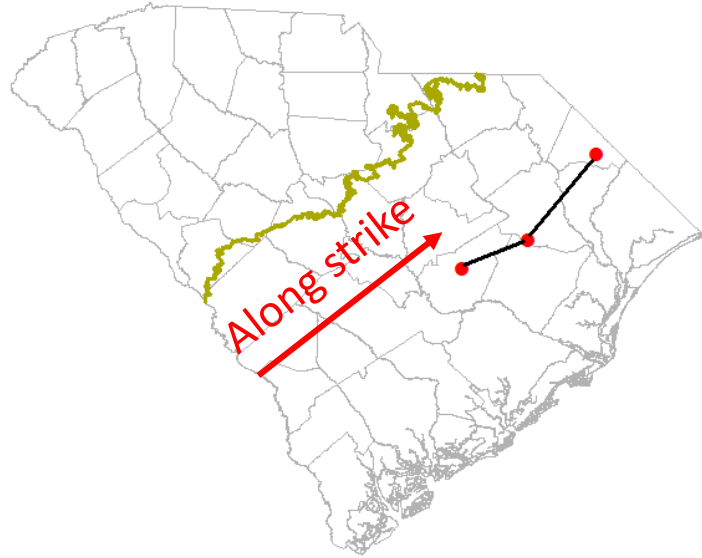


SC Hydrogeologic Framework Along Dip





SC Hydrogeologic Framework Along Strike

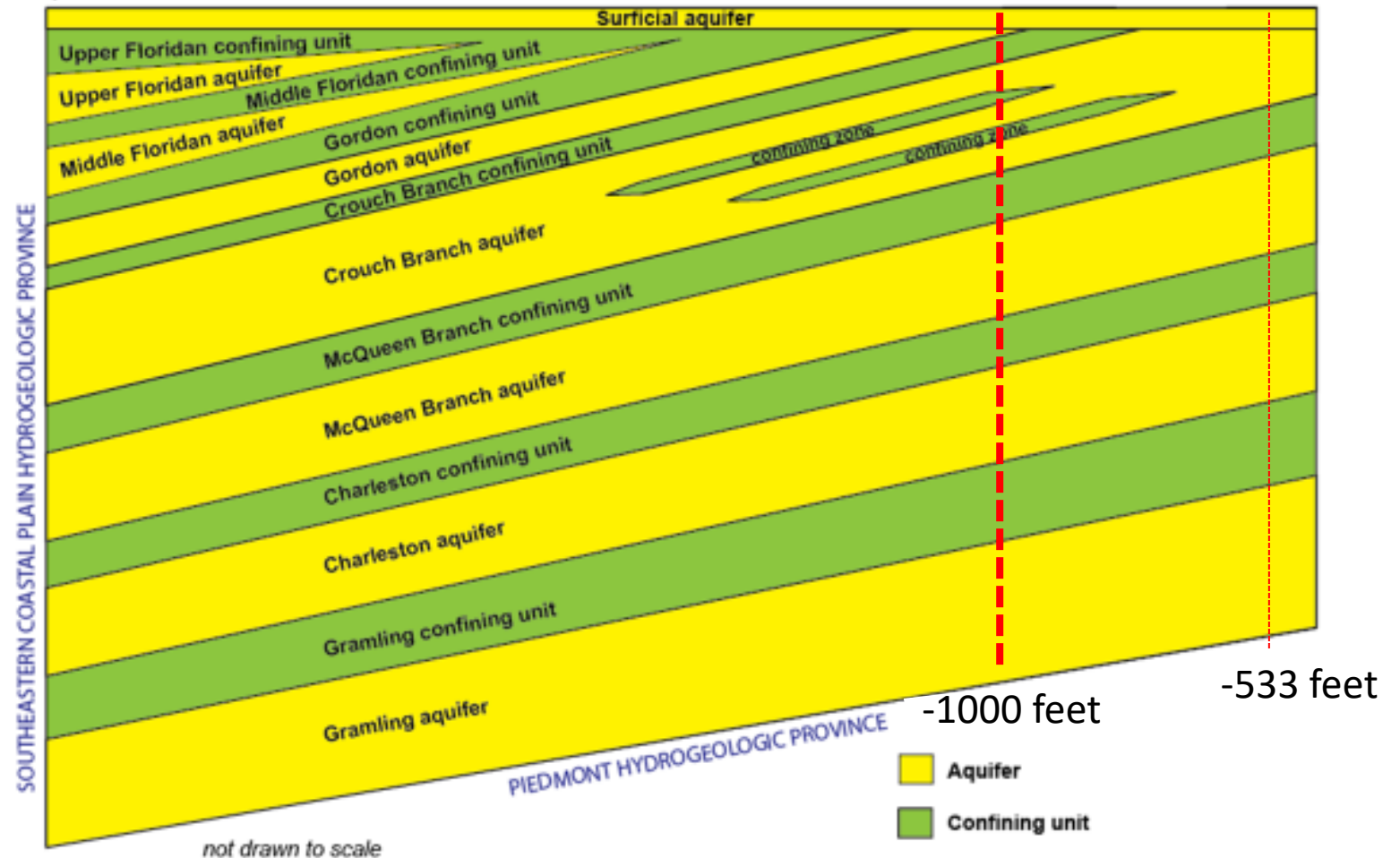


Clarendon
County
125 feet

Dillon
County
95 feet

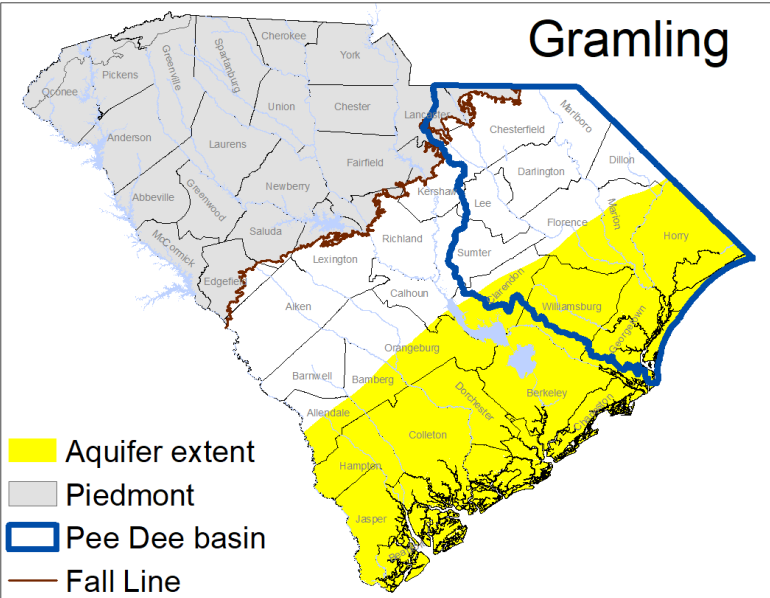
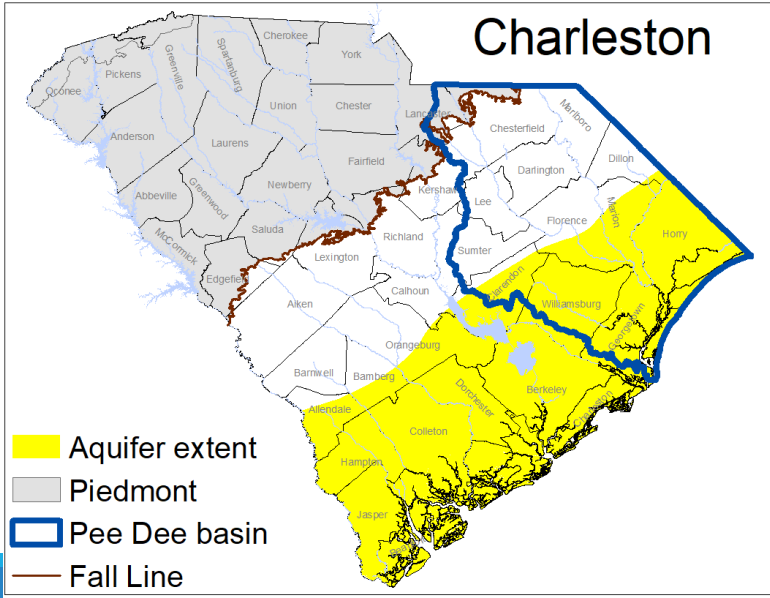
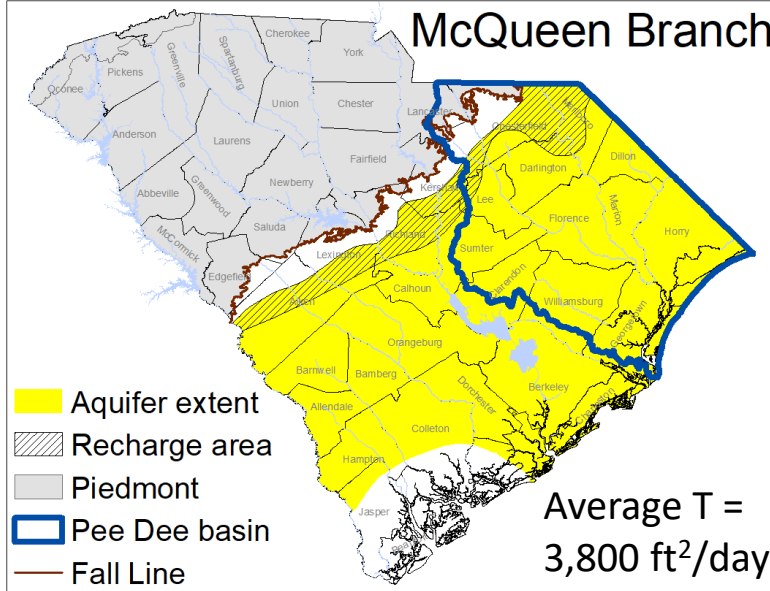
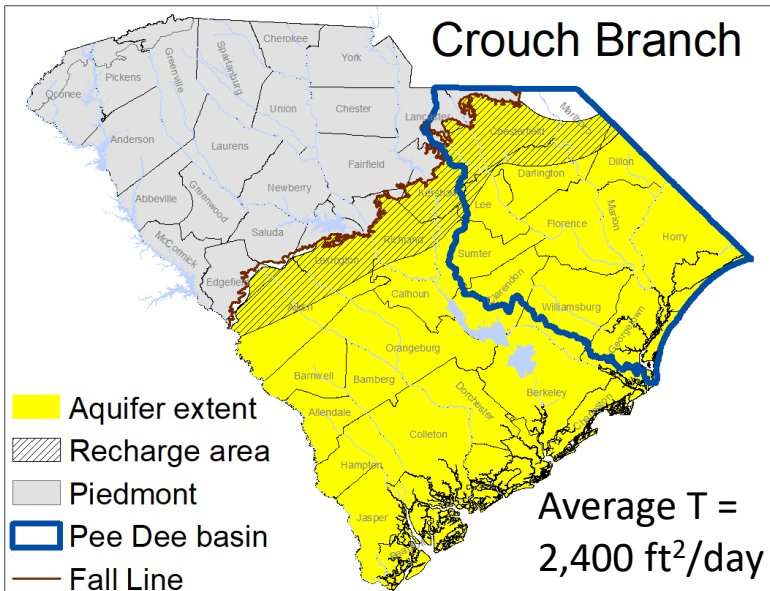
- Aquifer**
- Confining unit**

Feet referenced to NAVD88





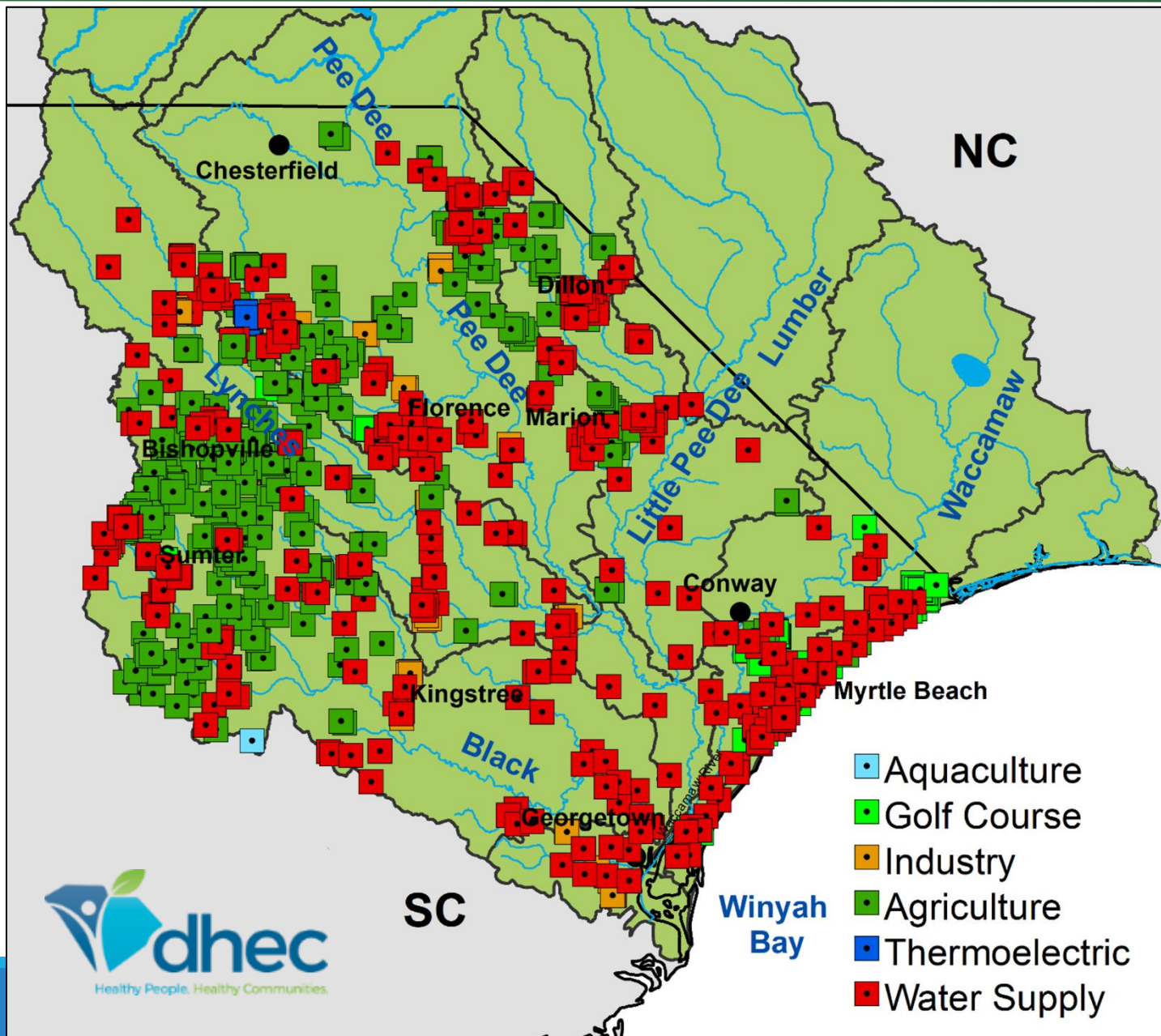
Aquifer Extents and Recharge Areas



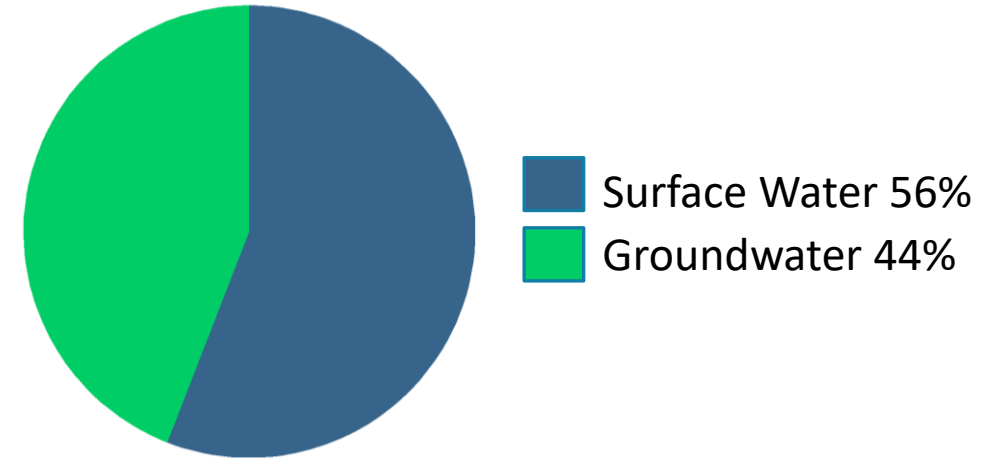
Recharge is 0 - 2 in/year

Transmissivity (T) is the ability of an aquifer to transmit water over its entire saturated thickness.

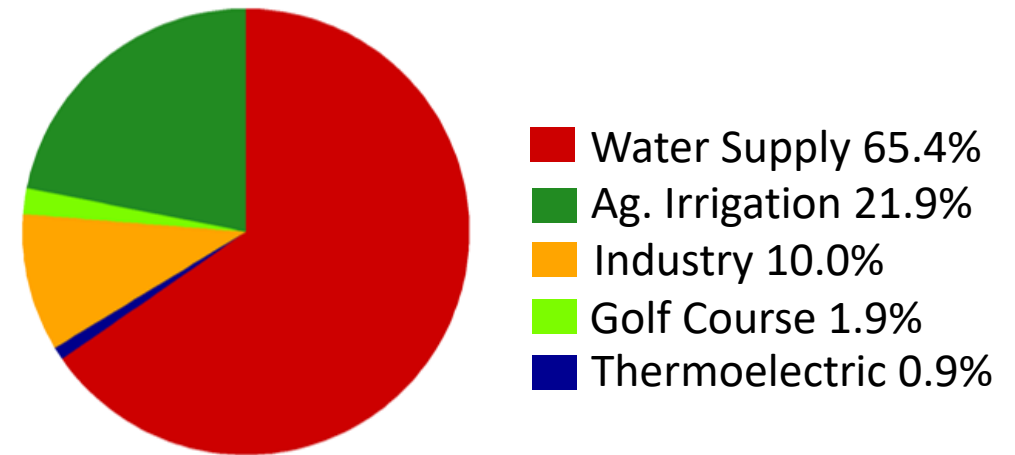
2021 Reported Groundwater Withdrawals in SC



SC water withdrawal excluding energy in basin



SC water withdrawal excluding energy by sector



Data source: SCDHEC Water Use Database

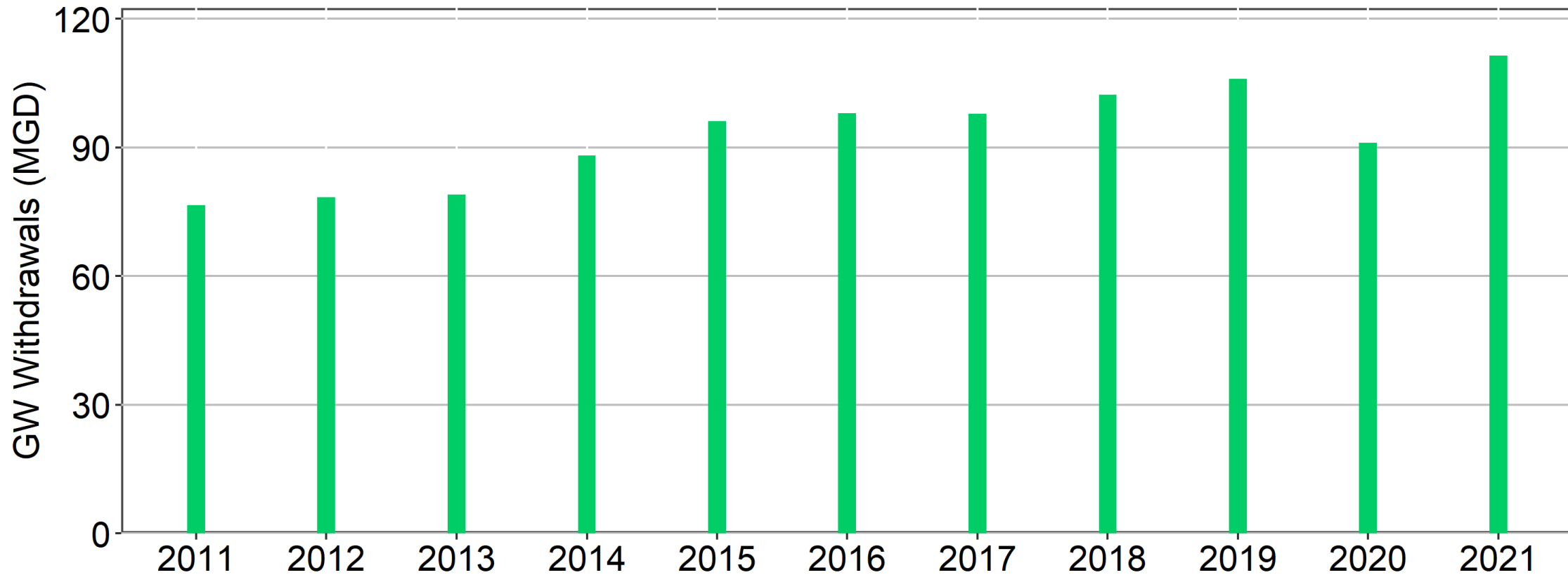




Groundwater Withdrawals (2011-2021)



Groundwater withdrawals, excluding Power

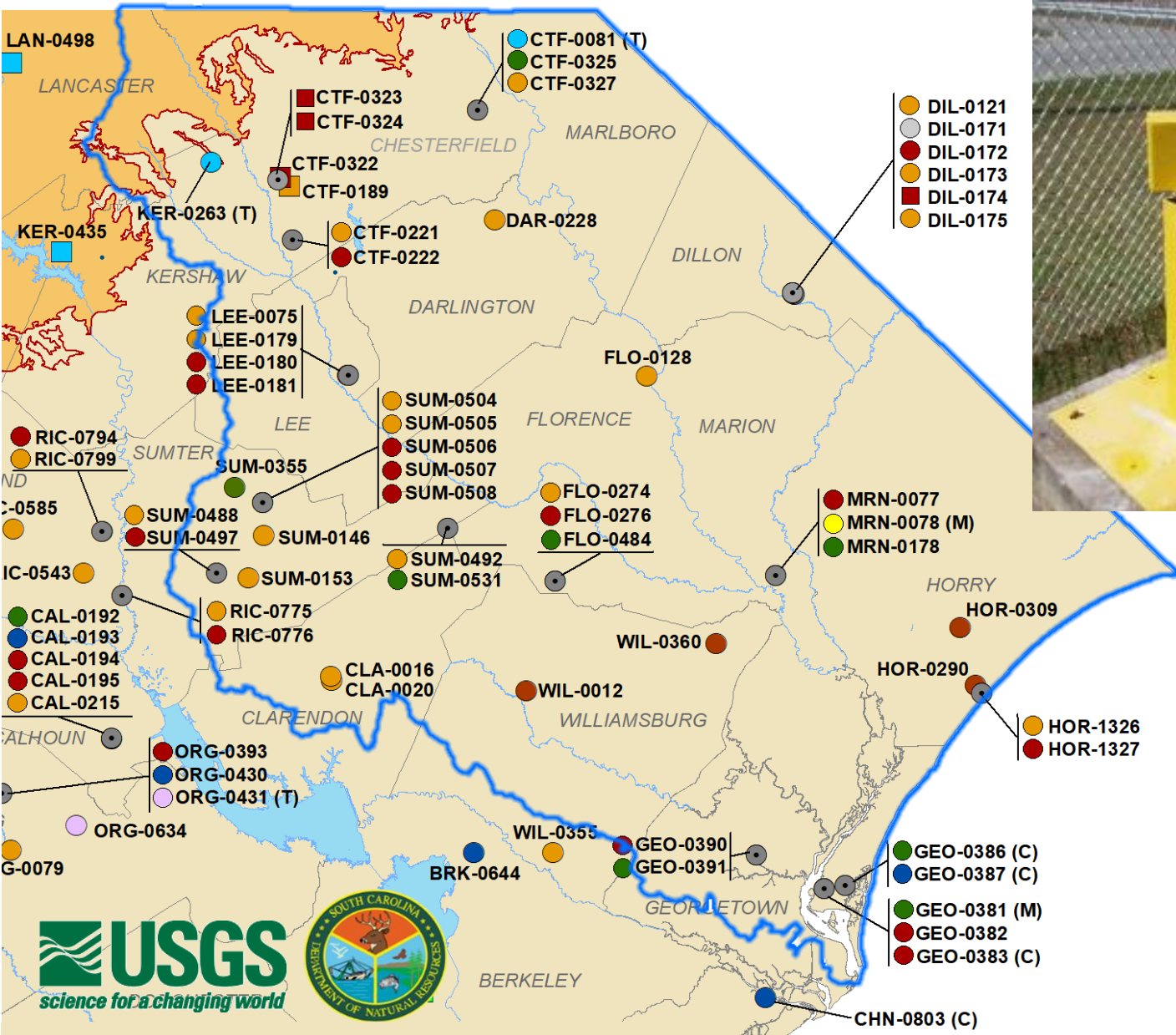


Data source: SCDHEC Water Use Database





Groundwater Monitoring Network



- 54 Wells in Pee Dee Basin completed primarily in McQueen and Crouch Branch aquifers
- Period of record ranges from 1 to 40 years

Aquifer

- Surficial aquifer system
- Gordon
- Upper Floridan
- Middle Floridan
- Crouch Branch
- McQueen Branch
- Charleston
- Gramling
- Gramling confining unit
- Crystalline rock

Agency

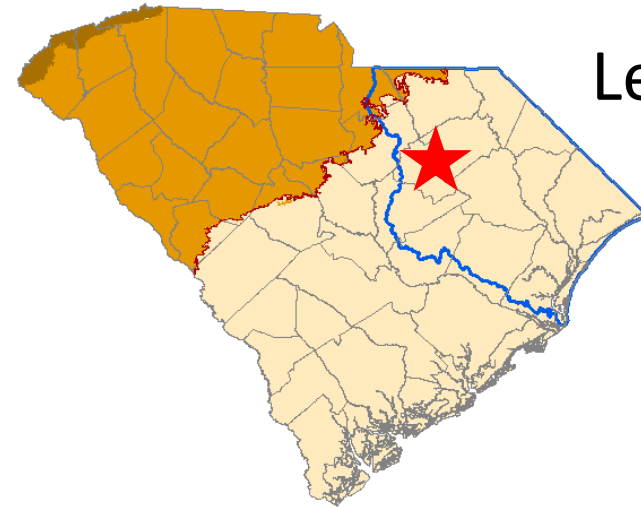
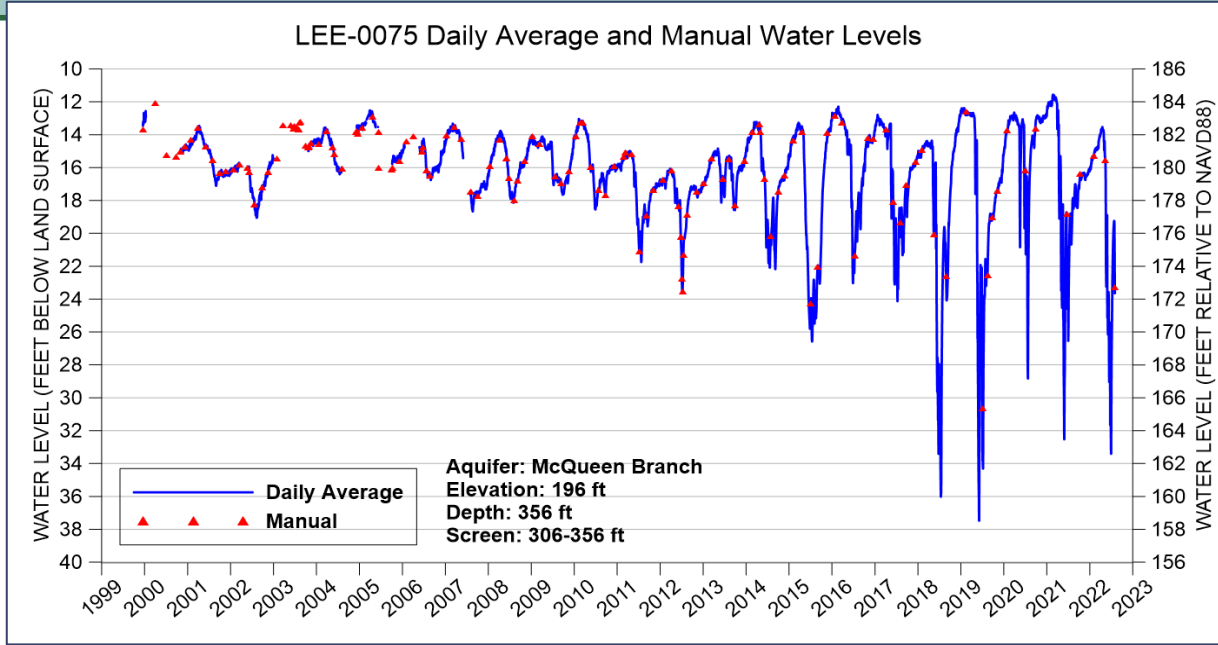
- SCDNR
- USGS
- Cluster site
- (M) Manual water level measurement
- (C) Water level and conductivity measurement
- (T) Telemetry Site

— Pee Dee Basin

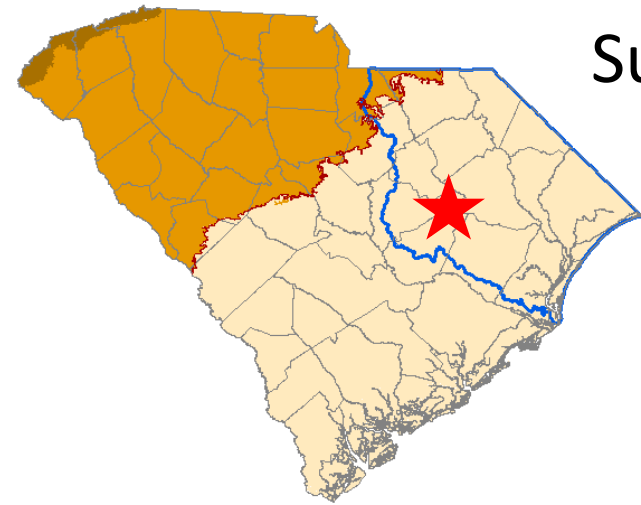
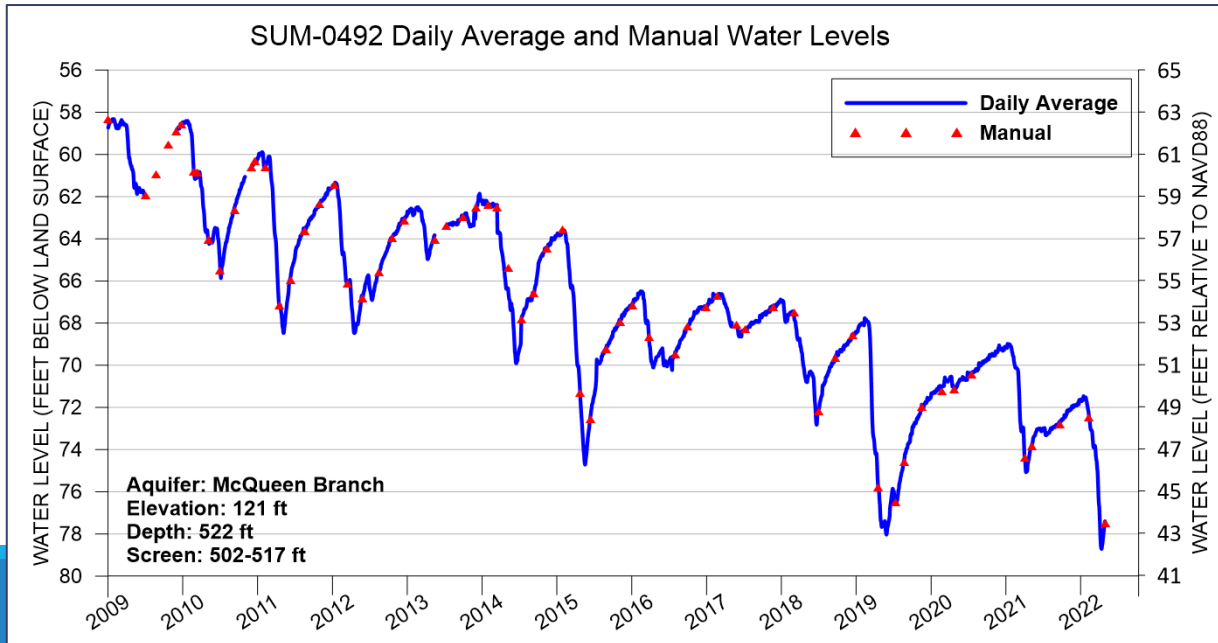




McQueen Branch Aquifer Groundwater-level Trends



Lee County

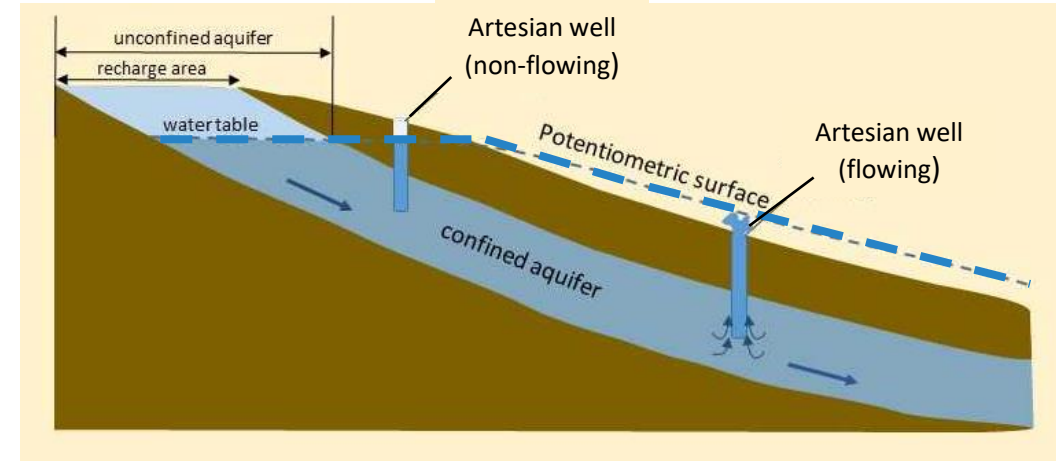
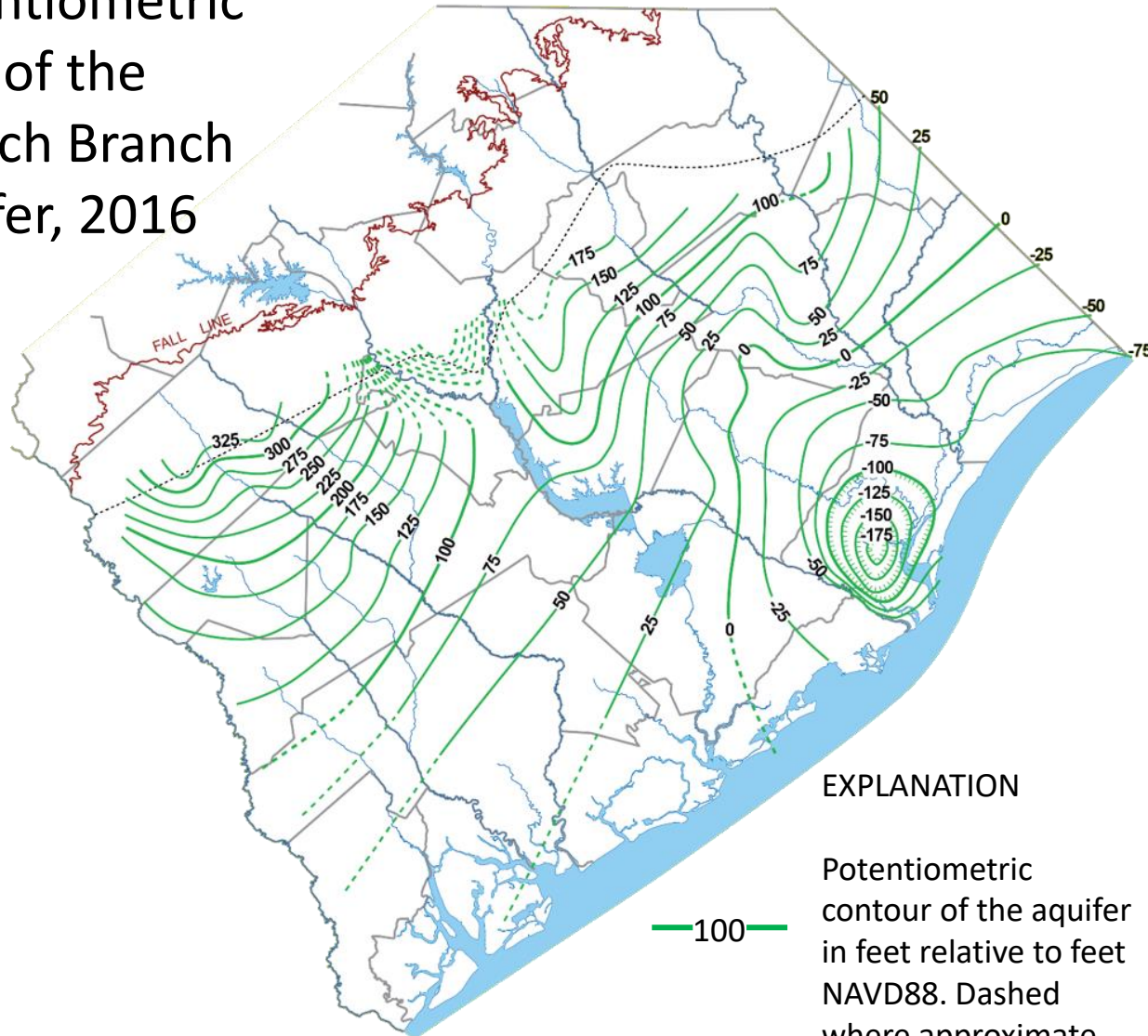


Sumter County



Potentiometric Mapping

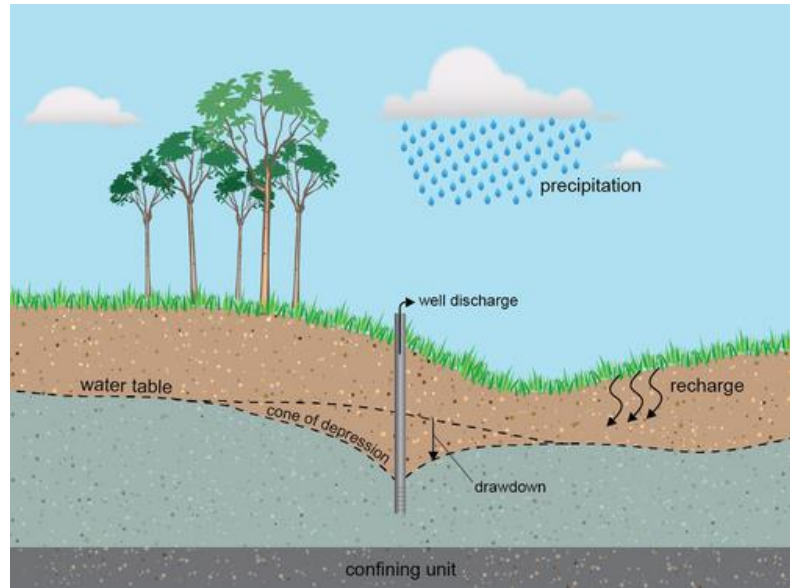
Potentiometric map of the Crouch Branch aquifer, 2016



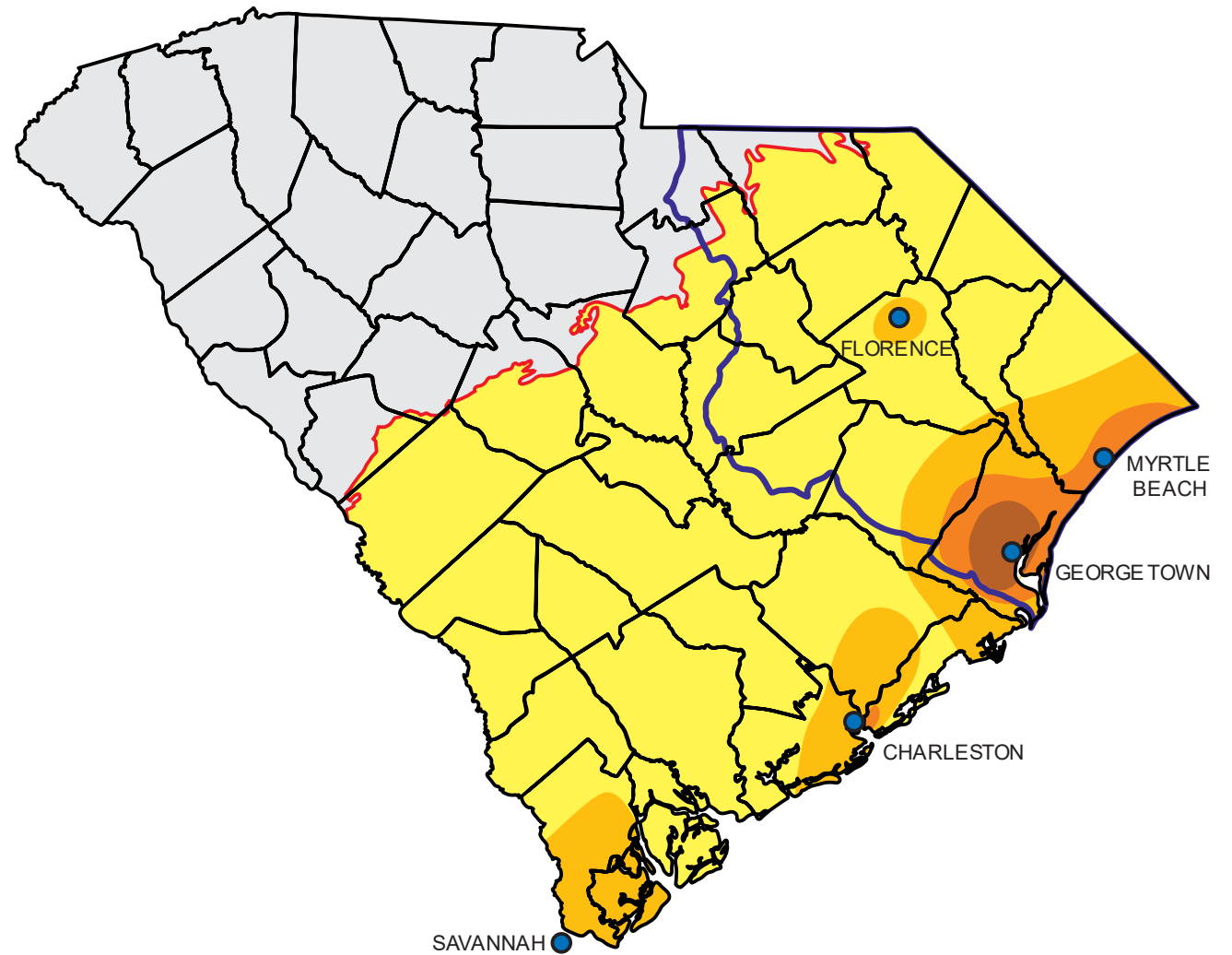
Potentiometric surface = the level in feet referenced to land surface elevation to which water rises as measured in tightly cased wells open to specific aquifers.



Major Cones of Depression in SC

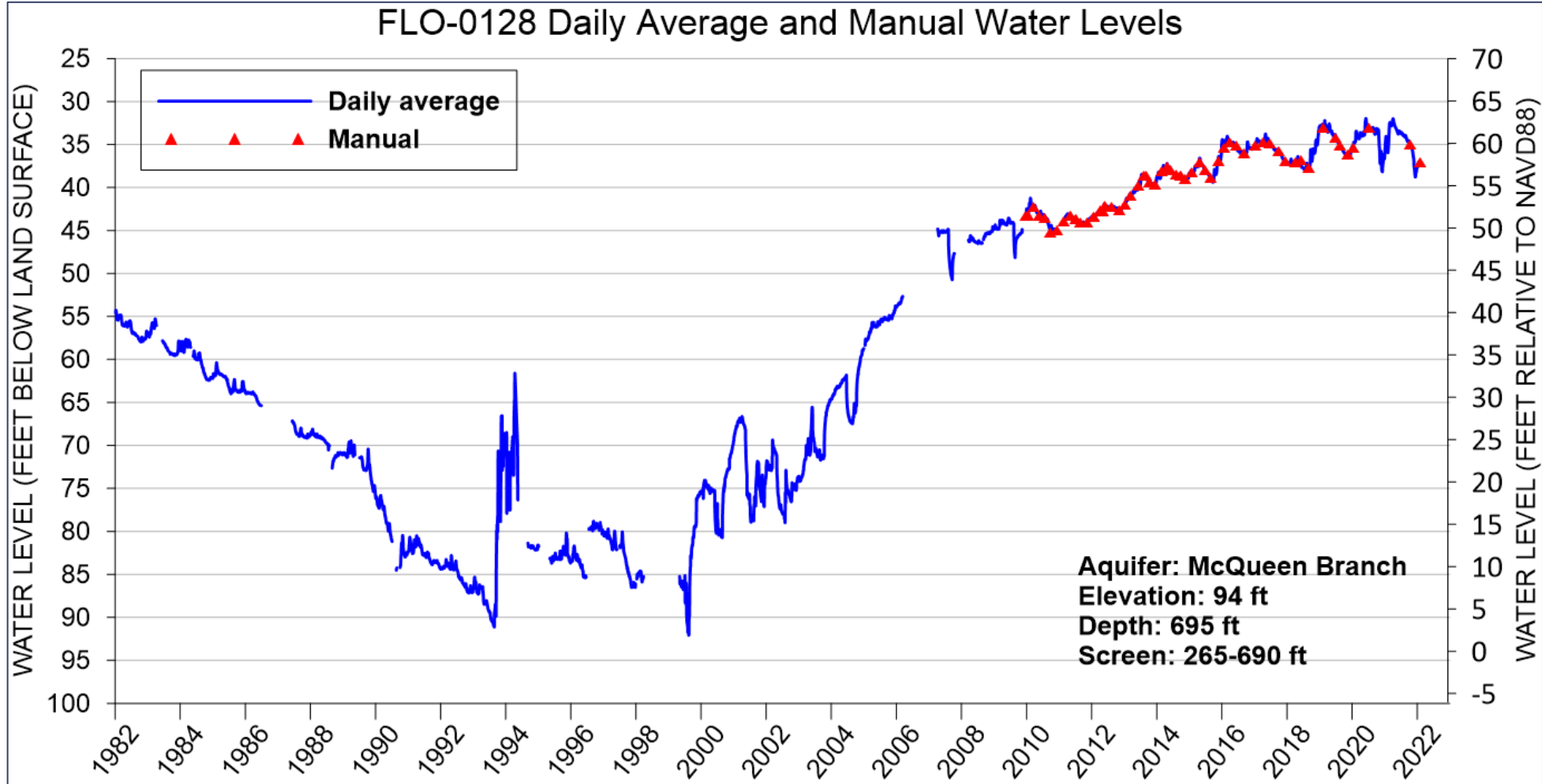


Long-term pumping can result in “cones of depression”, which are areas where groundwater levels have declined. The greatest declines are centered at the pumping wells, but the zone of influence can spread out for tens of miles.





McQueen Branch Aquifer Groundwater-Level Trends

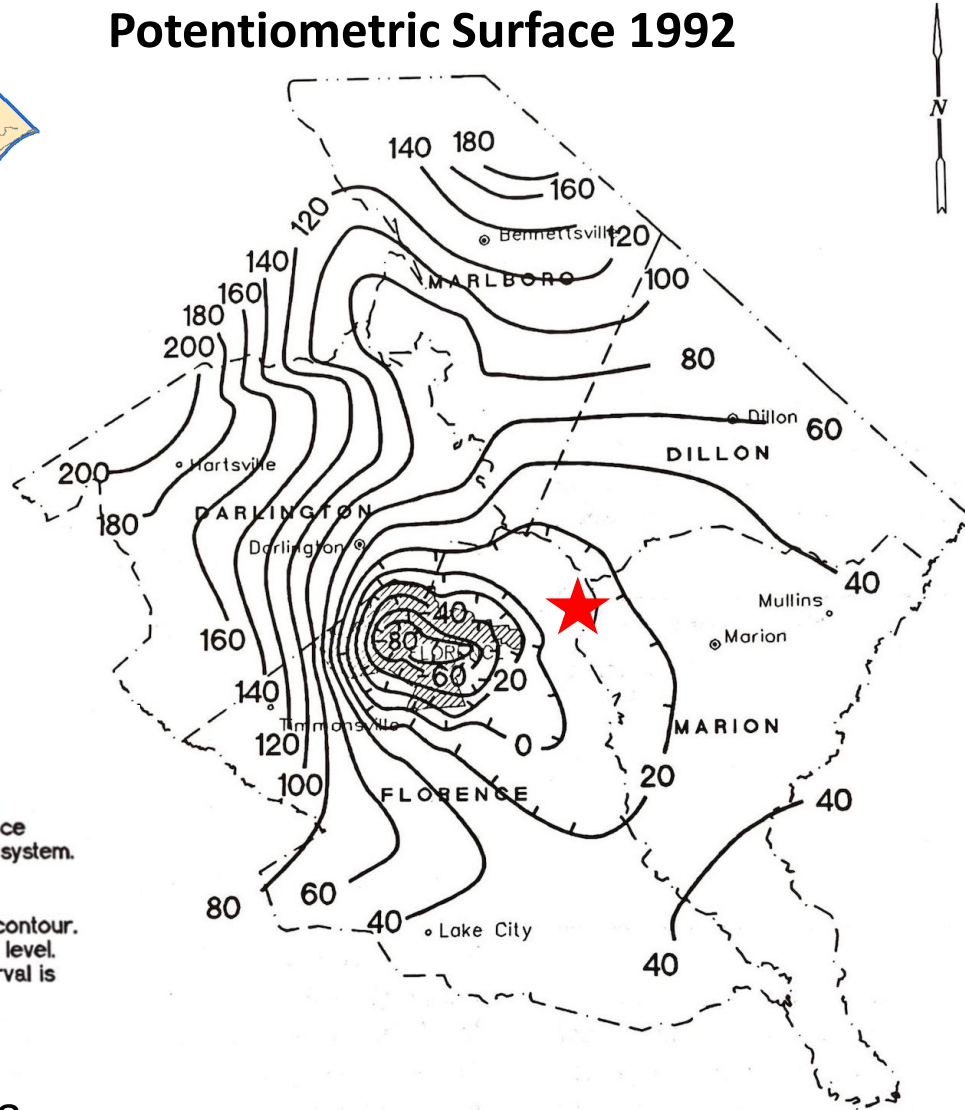




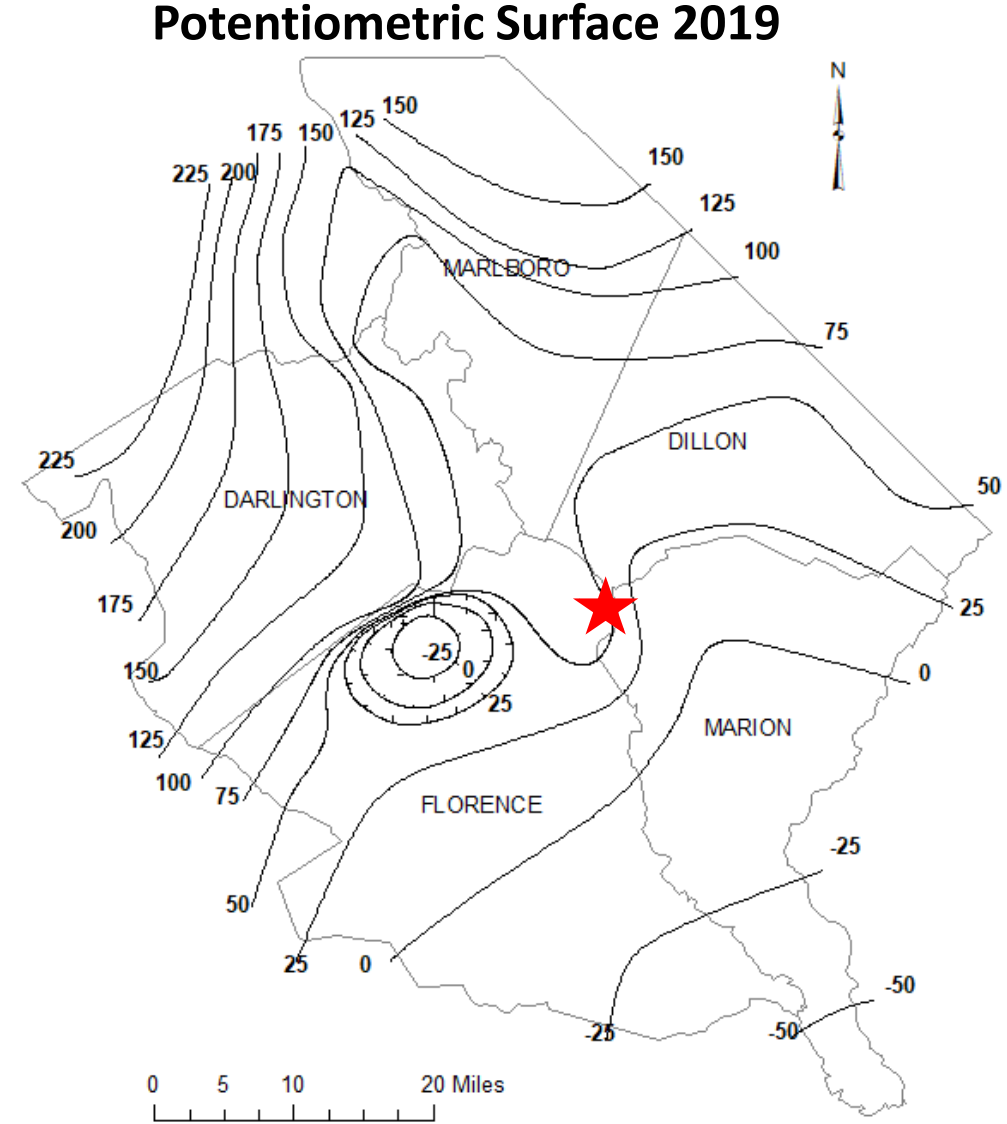
Cone of Depression in the McQueen Branch Aquifer




Potentiometric Surface 1992



Potentiometric Surface 2019



EXPLANATION

 Service area of city of Florence water supply system.

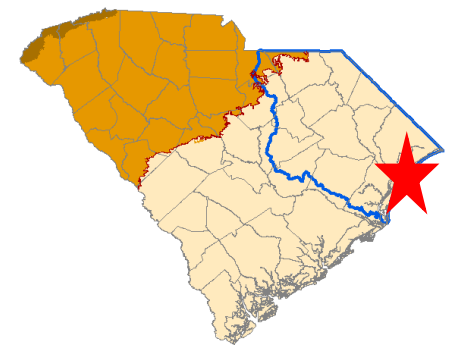
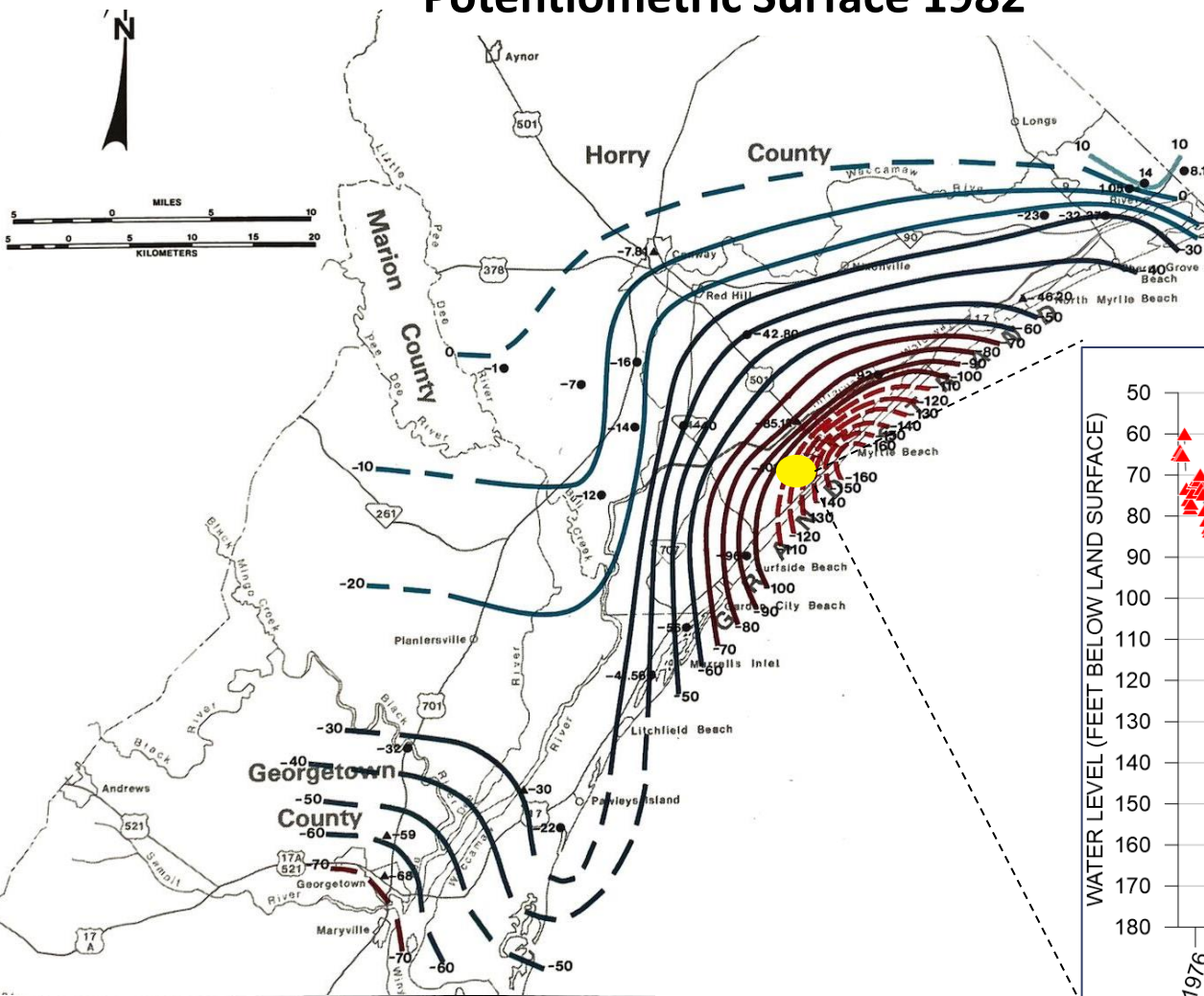
 40 Potentiometric contour. Datum is sea level. Contour interval is 20 feet.

 FLO-0128



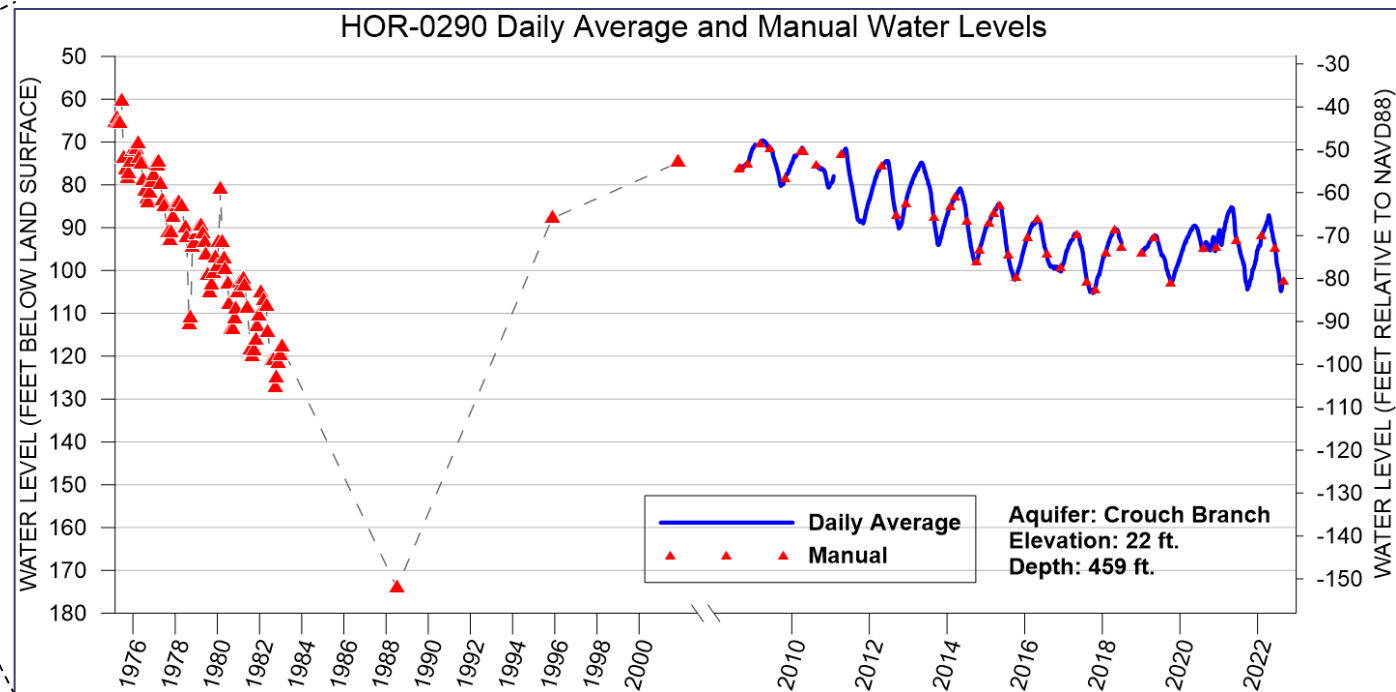
Crouch Branch Aquifer Groundwater-Level Trends

Potentiometric Surface 1982



Horry County

HOR-0290 Daily Average and Manual Water Levels



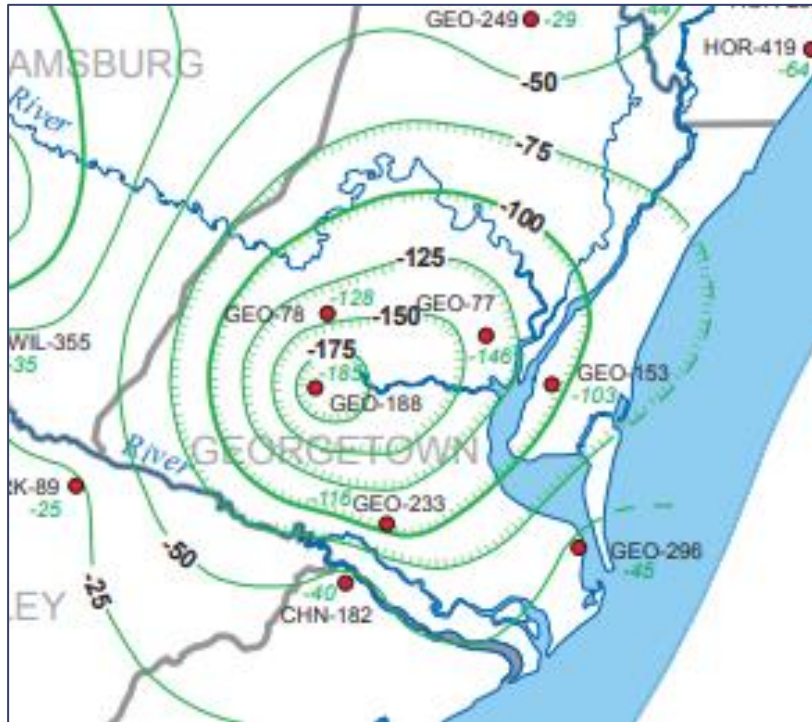
EXPLANATION

Water Level Contour Lines, Dashed where Inferred, Showing the Altitude of the Potentiometric Surface of the Black Creek Formation, September, 1982. Datum is Mean Sea Level. Contour Interval 10 Feet. Color Added for Emphasis.

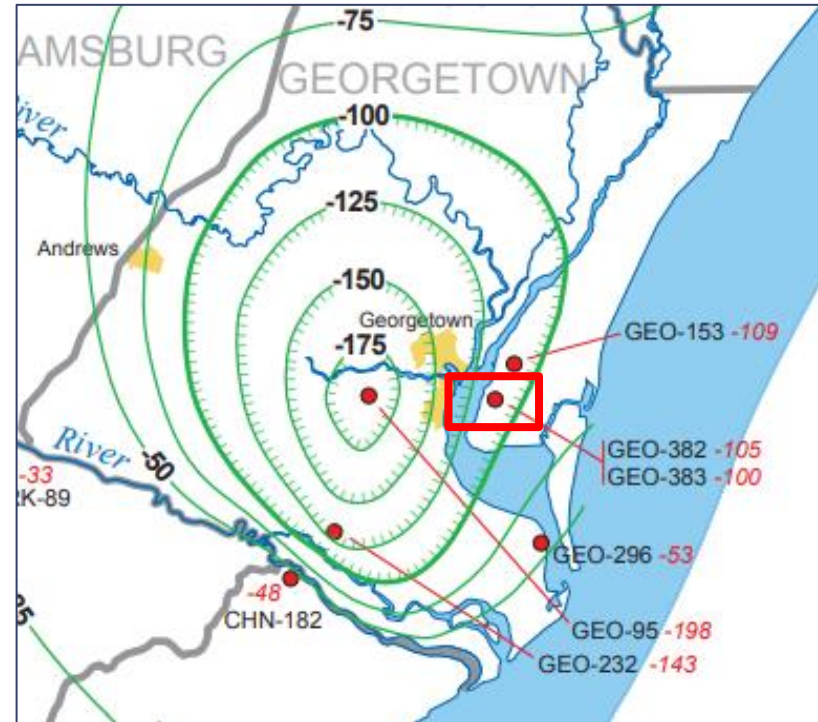


Cone of Depression in the Crouch Branch Aquifer

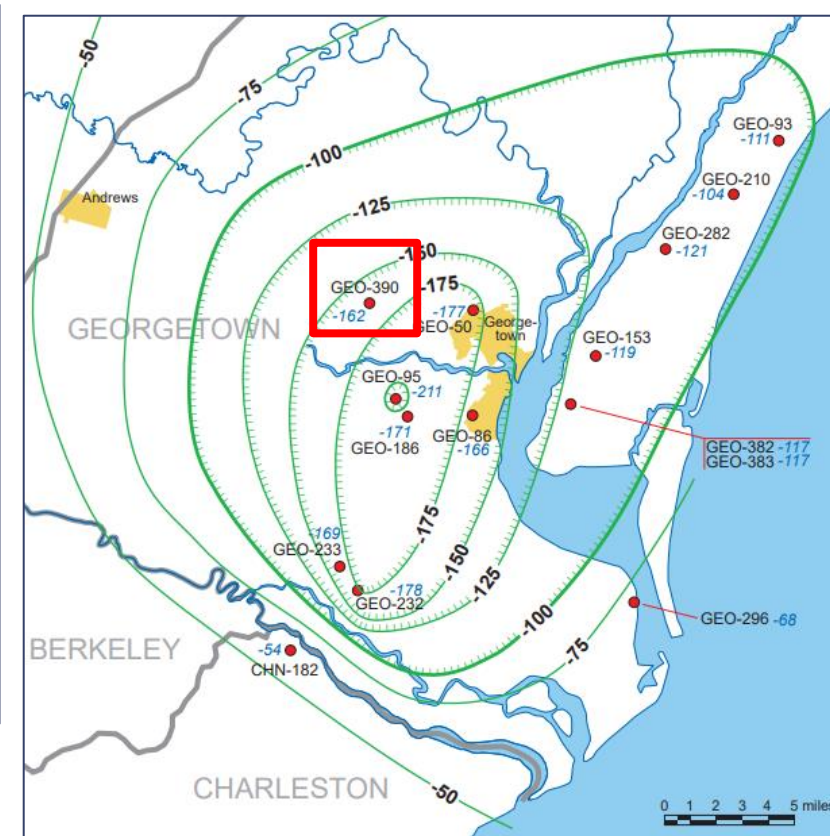
Potentiometric Surface 2012



Potentiometric Surface 2016



Potentiometric Surface 2020

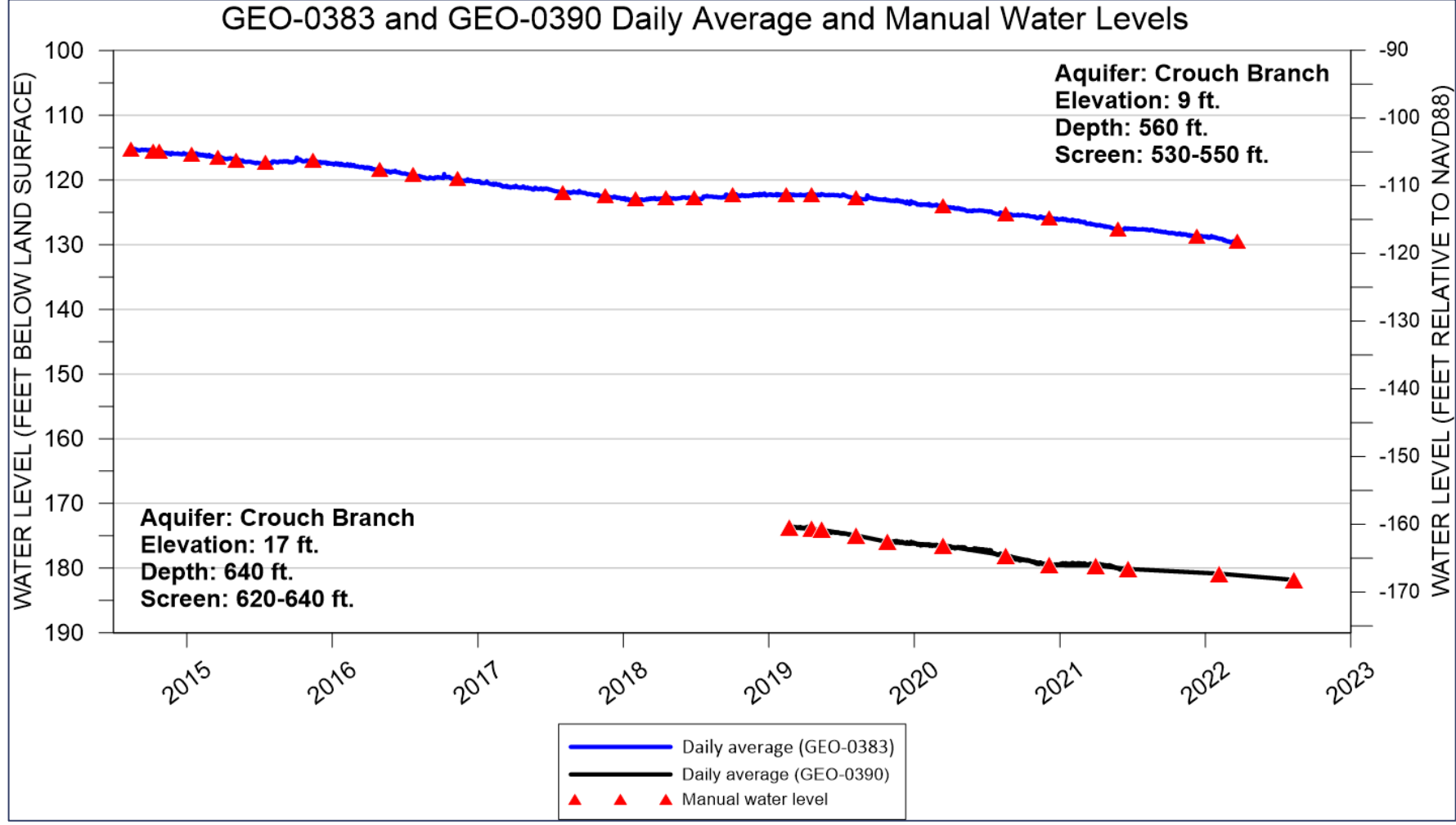


EXPLANATION

- Potentiometric contour, in feet NAVD 88; dashed where inferred
- Measured well, with county well number and potentiometric elevation, in feet NAVD 88
- Approximate updip limit of Crouch Branch confining unit
- Municipality



Crouch Branch Aquifer Groundwater-Level Trends



Georgetown County



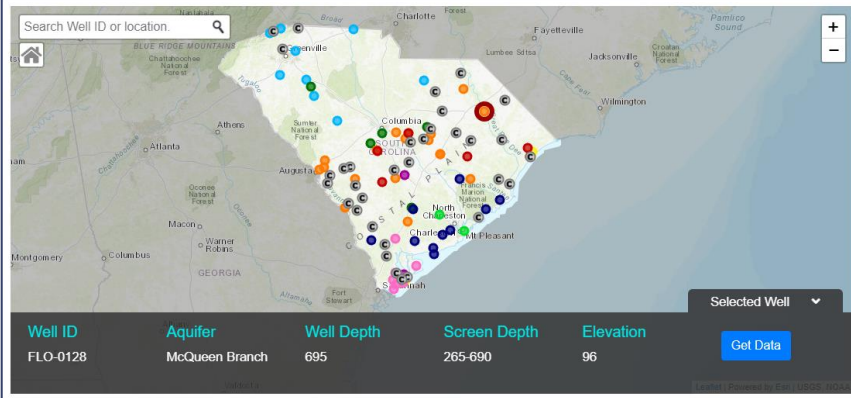
Groundwater Data and Publications



Overview

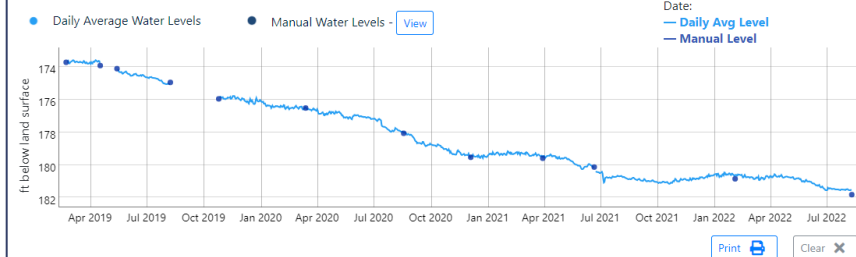
Use the data viewer below to view or download groundwater data from the SCDNR groundwater monitoring network. Daily average groundwater levels are provided in feet below land surface and are calculated for each day missing 7 or fewer hourly measurements. Manual measurements in feet below land surface also are available for review and download. In the case of flowing wells, where water levels rise above land surface, negative water level values indicate water levels are above rather than below land surface. Data downloaded from this site are saved in a CSV file format.

For any issues regarding viewing or downloading groundwater data, please contact Josh Williams (williamsjm@dnr.sc.gov).



Hydrograph

GEO-0390 --- Crouch Branch



Custom Axis Options

Set custom range values for the X and Y axes of the hydrograph. You can click and drag your cursor on the hydrograph to select a custom date range. Double-click the chart to return to the full period of record.

Date Range (X-Axis)

Start Date: 02/08/2019

End Date: 08/22/2022

[Update](#) [Full Record](#)

Value Range (Y-Axis)

Upper: 172.8

Lower: 182.6

[Update](#) [Default](#)

Hydrology Section Publications

Search and download reports and maps produced by the SCDNR Hydrology Section.

Overview

Listed in the table below are all the reports produced by the SCDNR Hydrology Section and its predecessor, the South Carolina Water Resources Commission (SCWRC) relating to the surface water and groundwater resources of South Carolina. Copies of these reports are available for review in the SCDNR's Columbia office, and many reports are available for download as pdf files. To request copies of these reports, or for more information about these publications, contact Andrew Wachob at wachoba@dnr.sc.gov or by phone at (803)734-6440.

Publications Table

Show 10 entries

Search:

Title	Author(s)	Date	Publication #	Counties or Region
Potentiometric Surface of the Crouch Branch Aquifer in South Carolina, November-December 2020	Brooke Czwartacki and Andrew Wachob	2021	SCDNR Water Resources Report 66	Coastal Plain
SCDNR Groundwater Monitoring Network Status Report, July 2014 through June 2019	Joshua M. Williams, Brooke Czwartacki, Jess McDaniel, and Andrew Wachob	2021	SCDNR Water Resources Report 65	Statewide
An Assessment of Groundwater-Quality Conditions and Chloride Distribution in the Charleston and Gramling aquifers in Berkeley, Charleston, and Dorchester Counties, South Carolina, 2020	Brooke Czwartacki	2021	SCDNR Water Resources Report 64	Berkeley, Charleston, Dorchester



Summary



SCDNR Contacts



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- Groundwater is an important resource in the basin
 - Crouch Branch and McQueen Branch aquifers are the primary aquifers in the Pee Dee Basin
 - Aquifers are highly transmissive with large volumes of water
- Regional groundwater declines have been observed due to pumping rates exceeding the recharge rates
- Groundwater-level data and potentiometric maps illustrate areas of decline
 - These datasets can identify data gaps and inform where additional monitoring is needed